'Run for home': SME Lending and the Head Quarters bias

Tianshu Zhao (Birmingham Business School, University of Birmingham)

Kul Luintel and Kent Matthews (Cardiff Business School, Cardiff University)

September 2016

Abstract

This paper is aimed at two strands of the empirical literature in banking. First, it tests for the geographical dimension in SME lending as a rebuttal of Petersen and Rajan (2002) on the relevance of relationship banking for SME lending. Second, it examines the Stein (2002) view that large institutions with complex organisational structures are more able to filter 'hard' information than 'soft' information. Using data on individual bank lending to SMEs and mortgage lending by postcode area for 120 localities in Great Britain for the period 2013(2)-2014(4), we estimate a panel model on 8393 data points. We conjecture that as the same bank makes SME loans and mortgages to the specific postcode area, it would utilise the informational technology of its common organisational structure. Locality and bank fixed effects allow us to disentangle credit supply and demand and to simultaneously control for the unobserved traits of banks and the borrowers in the localities they lend to. Our results show that functional distance between bank headquarters and branches is negatively related to the net underwriting of SME lending but has no impact on mortgage lending. We interpret these results as strong support for the geographical dimension and a vindication of the conventional view that SME lending requires the transmission of 'soft' information through the intermediation of a Relationship Manager who has been largely removed from the banking organization.

Keywords: SME lending, bank finance, functional distance

JEL Codes: G21, G290, L140

Corresponding Author: Dr Tianshu Zhao, Birmingham Business School, University of Birmingham, +44 (0)121 414 6216, T.Zhao@bham.ac.uk

1. Introduction

Location and proximity have emerged as important features in the geographical distribution of bank credit to Small and Medium sized Enterprises (SMEs) (Zhao and Jones-Evans, 2016). The geographical dimension to bank lending is underpinned by credit market theories of asymmetric information, uncertainty and organizational incentive structures, particularly with regard to SMEs. This strand of literature highlights the geographical 'closeness' of banks to firms as the means of overcoming issues of informational asymmetries, but it distinguishes between two types of closeness, namely, 'operational distance' (the distance between bank branches and the borrower) and 'functional distance' (distance between bank branches and the headquarters of branches) (Alessandrini et al., 2009; Presbitero et al., 2014).

Operational distance relates to the informational asymmetry between the borrower and the bank branch that is mitigated by 'relationship banking'. The closer the proximity of the two actors as measured by operational distance, the greater the effectiveness of relationship banking in transmitting 'soft information'. Conversely, the wider the distance between the two actors, the weaker the effectiveness of relationship banking in gathering private 'soft' information, and the stronger the dependence on 'hard information' or 'transactional banking' (Berger and Udell, 2006). Credit availability depends not only on personal face-to-face contacts with borrowers by the branches in the same area, but also the size of the institution to which the branches belong. Large banks may provide fewer retail services to informationally opaque small businesses for whom its intimate knowledge, its owner and its local market gained over time through a relationship with the financial institution is important. Such banks would be more likely to suffer from scope inefficiency in producing outputs which may require implementation of quite different policies and procedures (Berger and Strahan, 1999).

Following the argument that for an integrated firm, authority over all decisions necessarily resides at the top of an organization Baker et al., (1999), Alessandrini et al. (2009) hypothesize that the principal-agent problem between the local branch and senior management at headquarters (HQ) is a function of their physical distance. The argument is made that senior managers at HQ depend on the filtered information from local managers to make credit allocations. This is also supported from a separate strand of the literature that emphasises 'social connectednesses'. It is argued that social connectedness uniquely shapes

credit access and costs in banking transactions. The reliability of soft information provided by local relationship managers increases with the physical closeness between local managers and senior managers at HQ because proximity facilitates social connections as a channel of information transfer (Cohen et al., 2008, 2010; Engelberg et al., 2012). The increased difficulty in the upward transmission of soft information faced by relationship managers located in locations further from HQ could negate their incentives to generate soft information (Udell, 2009)). The weakened incentive of the local branch manager, however, exists *only* when information is soft. Where the decision of whether or not to extend credit is likely to be made "hard," verifiable information, the local branch manager would be incentivised to produce enough positive hard information to convince their superiors in order to get more of the bank's internal capital resources (Stein, 2002).

However, in contrast to the distance matters finding of researchers, Petersen and Rajan (2002) argue that the greater capital intensity of lending through the use of computers and communication technology has altered the way loan decisions are made. Technology has broken down the barriers of asymmetric information associated with SME lending and the need for the translation of 'soft information' which is inversely related to distance. Petersen and Rajan (2002) make the bold claim that by being able to access 'hard information', lenders have been able to make more efficient credit decisions where distance matters less and also explain the trend in consolidation and restructuring of banks, not due to deregulation and competition alone but through technological change.

A second strand to the literature on the geographical dimension of SME access to bank credit relates to the condition of the banking community. It is argued that in a financial crisis, increased risk perception could influence the willingness and the terms on which banks are prepared to lend. The immediate benefits and/or informational content of the available hard information dropped, while its cost remained the same (or even increased because of the increased uncertainty) (Ongena, 2014). This could translate into selective deleveraging of bank lending, resulting in 'flight to quality' or 'flight to headquarters'. One version of 'the flight to quality' argument is that following a negative aggregate shock banks contract their credit to smaller and riskier firms, whereas they accommodate the increasing credit demand of larger and safer firms (Lang and Nakamura, 1995; Bernanke et al., 1996). Banks could also display a 'flight to headquarters' and a 'run for home', even within a country (De Haas and Van Horen, 2013), driven by the need to safeguard the reliability of hard information by

qualitative contextual explanation, and the quality of which is negatively related to the distance (Berg et al., 2013). Prioritizing lending to the markets where the bank has a stronger intrinsic capacity in handling principal-agent problems is reflective of banks' effort to achieve a better trade-off between the cost and the quality of information production (Ruckes, 2004). Moreover, the shock that experienced by the banking community in financial crisis would propagate into future risk taking due to institutional memory (Bouwman and Malmendier, 2015).

This paper brings these two strands of literature together to examine the post-crisis availability of bank credit by geographical location in Great Britain. First, it reaffirms the geographical dimension in SME lending as a rebuttal of Petersen and Rajan (2002) argument on the conventional 'relationship' versus 'transactional' banking in the provision of SME lending. Second, it finds support for the Stein (2002) view that large institutions with complex organisational structures are more able to filter 'hard' information than 'soft' information via the comparison of the impact of functional distance on the loan products characterised by different degrees of the intensity of 'soft information'. We use data on individual major British bank lending to SMEs and mortgage lending by postcode area for 120 localities in Great Britain for the period 2013(2)-2014(4). The data for SME lending consist of 6 major British banks and for mortgage lending it includes data from the Nationwide BS. Different banks supply both SME loans and mortgages in the same postcode area. The structure of the data allows us to follow the existing literature, e.g. De Haas and Van Horen (2013) among others, and use locality and bank fixed effects to disentangle credit supply and demand and to simultaneously control for the unobserved traits of banks and the borrowers in the localities they lend to. Also, as the same bank makes SME loans and mortgages in the specific postcode area, it would utilise the common organisational structure and informational technology. This provides us with an instrument of control for the examination of the impact of functional distance on SME lending, which in turn depends on the transmission of 'soft information'. Since mortgage lending mainly requires the transmission of relatively low cost 'hard' information, but with the trend to transactional banking, using mortgage lending as a control, we would expect to find that functional distance should not matter for either SME lending or mortgage lending.

To preview our results, we find that functional distance is strongly negatively related to net underwriting in SME lending but has no impact on that in mortgage lending. We interpret

these results as a vindication of the conventional view that SME lending requires the transmission of 'soft' information through the intermediation of a Relationship Manager who has been increasingly removed from the credit granting picture in recent years. We also find the prevailing geographically localized social trust has no influence on the impact of functional distance on SME lending, but seems to increase the net underwriting of mortgage in the locality with longer functional distance., We take this as a confirmation for the argument that the impact of functional distance on incentives of local branch manager in producing and transferring information depends on types of information. This paper also reports evidence of a post-crisis run-to-home behaviour consistent with the 'flight to headquarters' view.

This paper is organised in the following way. In the next section we briefly review the literature on the geographical dimension in SME lending and posit the main hypotheses to be tested. In the third section we present the data, its properties and the models for our econometric analysis. In the fourth section we discuss the main results and tests for robustness. The final section concludes.

2. The geographical dimension

This section poses the stark question: does geography still play a role in SME lending by the banks? Put in this way in a challenge to the orthodoxy, Petersen and Rajan (2002) argue that technology, if not having broken, certainly is breaking the tyranny of distance as far as small businesses are concerned. They contend that improved informational productivity has brought an increasing amount of hard information to bear on credit decision, reducing the importance of the geographical distance between the borrower and the bank in the provision of small business lending.

The regional segmentation of the credit market for SMEs is a well-established phenomenon (see Dow and Rodrigues-Fuentes, 1997) that exists even in economies with an extensive branch banking system (Dow, 1992). The received wisdom from the banking literature is that SME lending requires the generation and transmission of 'soft information' through the intermediary of the Relationship Manager from the borrower to the bank. Soft information requires the face-to-face interaction of the Relationship Manager between the SME borrower and the bank credit committee or decision maker, which in turn necessitates physical

proximity. The physical presence of bank branches in the vicinity of the SME borrower creates the conditions for Relationship Managers to collect soft information at a lower cost (Udell, 2009; Agarwal and Hauswald, 2010) [1]. Since discretionary authority over lending has been removed out of local branch officers and replaced by a centralization of underwriting, relationship banking and the effectiveness of transmitting 'soft' information is inversely related to the geographical distance between the borrower and the ultimate credit decision maker (Zhao and Jones-Evans, 2016). Stein (2002) emphasises the role of the organisational complexity of the bank and the efficiency of information transmission within the bank organization influence the *ex ante* incentives of local branch managers to create and pass on *various types of information*. In particular, the hierarchical structure only weakens local branch officers' incentives when the information they transfer is primarily soft. In the case where the information is primarily hard, local branch officers would struggle to produce enough positive information to convince their senior managers that they should get more of the bank's resources. While it is indisputable that the development of information technology reduces the cost of processing information, it would not change the nature of soft information on borrowers or make its collection and collaboration on soft information easier at a distance (Petersen, 2004).

It is widely argued that the tightening of credit conditions for small businesses have occurred because of the inability of banks to produce the 'soft' information that would be the mainstay of relationship banking and the decline of relationship banking is partly the cause of the regional disparity in SME financing. In contrast to 'relationship lending', banks that specialise in 'transactional lending' - that is lending based on 'hard information', find dealing with opaque/small business enterprises costly to administer. Driven by consolidation and deregulation the trend of the retail banking system in the UK has been to concentrate lending decisions at regional centres and headquarters. Accelerated branch closures during the 1990s and increased utilization of impersonal statistical modelling methods in the credit risk analysis has fuelled the accusation that relationship lending has increasingly been replaced by transactional lending and banks have moved from one type of lending relationship to another with SME financing being the victim.

[1] The proximity of bank branches to borrowers may also create additional market power to the lending bank (Degryse and Ongena, 2005) and (Alessandrinin et al, 2009).

While this simplistic view has been challenged by Berger and Udell (2006) that the balance between 'soft' and 'hard' information transmission and reciprocally the balance between 'relationship' and 'transactional' banking is a two-way outcome, the geographical dimension is maintained because the cost of garnering and transferring soft information increases with distance. But the relevance of geography to SME lending does not go unchallenged. Technology and the adoption of statistical techniques in underwriting bank credit has reduced the costs of information and risk evaluation of loan applicants (Petersen and Rajan, 2002; Berger and Frame, 2007), reducing the need for a local presence (Chakravarty, 2006). It is argued that it is the viability of a project rather than the physical proximity of a bank to the firm is the key factor determining SMEs' access to bank credit (Klagge and Martin, 2005). Specifically, a study by Hutchinson and McKillop (1990) argue that the Northern Irish financial sector is sufficiently integrated into the UK financial market so that there is no significant regional dimension in the availability of finance.

However, other studies reaffirm the geographical dimension with the spatial imbalances in the access to finance having been identified by Alessandrini et al (2009), Benvenuti et al (2010), Özildirim and Önder (2008), Martin and Sunley (2015), Degryse et al (2015) and Zhao and Jones-Evans (2016). The theoretical underpinning in these papers is based on the notion that regular contact between the supplier of credit and the firm facilitates greater credit access and distance is an element in this.

3. Data and econometric specifications

We aim to identify if functional distance plays a part on the supply of bank credit to borrowers which is consistent with the soft information intensity of the loan products. The transmission of soft information is related to the proximity between local managers and senior managers at HQ for the investment decision of banks on who gets capital and at what cost. Closer social connection due to shorter functional distance is hypothesized to enhance actively acquire and transfer private information that would otherwise be withheld (Uzzi and Lancaster, 2003).

Data is gathered from several data sources. The data on the geographic profile of lending to SMEs[2] and personal mortgage in Great Britain[3] is collected from postcode lending data published on the websites of participating lenders. Since Q2 2013 onwards, seven of the UK's major lenders have voluntarily agreed to publish the outstanding stock of lending statistics, in line with British Bankers Association's (BBA) methodology and requirements, across 9000 individual postcode sectors on a quarterly basis. The dataset would allow businesses and the public to see clearly how the banking and building society sectors are serving the wider economy, and in what areas of the UK there is less lending. It is expected to bring the benefit of boosting competition and making it easier for SMEs to access finance. The personal mortgage dataset contains 7 participating lenders, namely, Barclays, Lloyds Banking Group, HSBC, RBS Group, Santander UK, Clydesdale & Yorkshire Banks and Nationwide Building Society. The SME lending dataset has 6 participating lenders above excluding Nationwide Building Society since its lending to small businesses is limited. The postcode attributed to a personal mortgage is determined by the correspondence address of the applicant. The postcode attributed to SME lending is derived from the business's primary trading location. Collectively, these institutions account for about 60 per cent of bank lending to SMEs, and 73 per cent of mortgage lending in Britain.

The definition of locality is the postcode area. In order to ensure that individual borrowing data should not be imputable directly, or in conjunction with other third party data, a set of parameters were agreed with the Government to ensure the protection of customer confidentiality and compliance with data privacy rules. This makes postcode area level comparisons more meaningful than that at postcode sector level. Specifically, borrowing amounts outstanding for a postcode sector are not disclosed if: 1). There are fewer than 10 borrowers active in the postcode sector, or 2). Borrowing within the postcode sector is highly concentrated amongst a small number of borrowers. In addition, Individual participating lenders are not obliged to publish borrowing at postcode sector level if they hold less than 10 per cent of SME borrowing and 3 per cent of mortgages in a postcode sector. The effect of the reduction filters may vary from quarter to quarter, which can make direct comparisons from quarter to quarter for some postcode sectors difficult. The postcode area has the

[2] SME lending figures relate to borrowing through loans and overdrafts ONLY. Other forms of finance (e.g. business credit cards or asset-based finance) are used by SMEs, but not included here.

[3] Figures cover Great Britain only, and so exclude Northern Ireland and the crown dependencies of Jersey, Guernsey and the Isle of Man.

advantage that since all data that is not disclosed as a result of these filters at postcode sectors is included in the postcode area level totals.

We include the figures for SME lending for Barclays, HSBC, RBS Group, Santander UK, Clydesdale & Yorkshire Banks in each of 120 postcode areas in England, Scotland and Wales from Q2, 2013 to Q4, 2014[4]. We include the figures for personal mortgage for Barclays, HSBC, RBS Group, Santander UK, Clydesdale & Yorkshire Banks and Nationwide Building Society across 120 postcode areas during the same period[5]. For Lloyds Banking Group, we only include the figures for SME lending and personal mortgage across the same set of postcode areas during Q1, 2013 to Q4, 2013 since totals for Quarter 1 2014 onwards exclude balances related to TSB Banking Group plc, which was previously reported within the Lloyds Banking Group's submission. We deflate all figures with the reference date of 2005 using the Consumer Price Index published by Office National Statistics.

Our baseline of the specification of econometric model is:

$$\Delta CR_{b,l,t} = \alpha + \beta LDIST_{b,l} + \delta SHARE\_AREA_{b,l} + \vartheta SHARE\_AREA\_TOTAL_{b,l} + \theta_b + \omega_t + \pi_l + \varepsilon_{b,l,t} \quad (1)$$

Our unit of observation is a bank-locality pair sample. Since we do not have the information on bank credit by recipient but by locality, we define locality as the destination of bank credit. The dependent variable in Equation (1) is the change in the outstanding of SME lending (Mortgage) by bank (b) in Locality (l) during time t and t-1. The main variable of interest is the measured by the physical distance between the branches of a specific bank (b) in a given locality (l) to its registered headquarters (i.e. $LDIST_{b,l}$). To take into account (1) local competitive pressure faced by a specific bank (b) and (2) the importance of the locality (l) to a specific bank (b), we construct the ratio of branches of bank (b) to all bank branches within the locality (l) (SHARE-AREA), and the ratio of branches of bank (b) in locality (l) to the total number of branches of the bank in the UK as a whole (SHARE-AREA-TOTAL).

Since our data set contains information on multiple banks that lend to the same locality, we can control for the demand for SME lending (Mortgage) at each locality by adding locality-

[4] The exceptional case is that Clydesdale & Yorkshire Banks report the outstanding of SME lending in q2, 2013 for four postcode areas, namely Llandrindod Wells, Luton Sutton, Taunton, Truro, and Wolverhampton as missing. We therefore did not include them in the dataset.

[5] The exceptional case is that Clydesdale & Yorkshire Banks report the outstanding of personal mortgage in q2, 2013 for the postcode area Torquay as missing. We therefore exclude it from the dataset.

specific fixed effects (i.e. π_l). Using borrower fixed effects in regressions based on a data set of borrowers that borrow from multiple banks have been utilized in literature as the identification strategy to pin down the heterogeneous supply effect on the variation in the differential outcome across banks in the credit market (see Khwaja and Mian (2008) and Schnabl (2012), among others, for similar application). A key advantage of this approach is that it allows us to neatly control for changes in credit demand at the locality level. The full set of locality fixed effects absorbs any locality-specific time-invariant characteristics that might influence loan outcomes. This means that we do not address the question of whether banks in general supply less to certain types of locality, such as ones that are more risky, less productive or with higher degree of economic uncertainty. Moreover, since banks are active in multiple localities, we include bank fixed effects (i.e. θ_b) to control for bank-specific time-invariant factors, either observable or unobservable, that might affect the supply of SME lending (Mortgage), following De Haas and Van Horen (2013). With locality fixed effects and bank fixed effects that may influence the underwriting outcomes being accounted for, we are able to identify the extent to which the heterogeneity in net underwriting in SME lending (Mortgage) by individual banks is associated with differences in banks' closeness to borrowers in various localities. We add quarterly fixed effects (i.e. ω_t) to capture the changes in economy-wide conditions, such as current and future expectations of GDP growth, inflation, and interest rates and general shocks affecting the economy. Finally, ε_{blt} is the error term. We estimate Equation (1) for SME lending and Mortgage, separately. The estimated coefficient on $LDIST_{b,l}$ (i.e. β) reveals the impact of functional distance on the net underwriting of SME lending (Mortgage).

The information regarding the branches of participating banks is derived from Experian's Shop*Point data on the location of branches of bank, and building society records for England, Scotland & Wales up to 04/11/2013. Shop*Point gathers retail information on who is located and the postcode of the location via site-surveyed Goad records plus records from data sources such as Thompson Directories and UK Companies House. The Experian's Shop*Point data is further cleaned by assigning the branches to the headquarters. For example, when Experian's Shop*Point indicates that the set of same branches belong to TSB Banking Group plc as well as Lloyds Banking Group, we assign them to Lloyds Banking Group. Using the postcode of branches of the bank and that of the registered address of the participating banks, it is possible to derive the physical distance measured in miles between

each of branches of the bank in the postcode area and the headquarters of the bank, using Bing Map. We compute the distance of each participating bank at the postcode area level, by taking the average of the physical distances in each postcode area. In keeping with a growing literature on the effect of social capital variables in explaining the variation of financial inclusion across geographical space (Cohen et al, 2008, 2010; Guiso et al., 2004), we construct measures of locality-specific social capital variables and allow them to interact with the functional distance. To the extent that higher level of social capital in the local society is expected to bring about more proactive communication of private information between local branch officers and potential borrowers, the estimated coefficient on the interactive term is to ask whether higher level of reciprocal trust and self-enforcement in the local society where the relationship managers and borrowers are cohabit, which according to the theory would enhance the use and the availability of financial contract, could mitigate the friction of functional distance on soft information intensive SME lending.

Specifically, we estimate:

$$\Delta CR_{b,l,t} = \alpha + \beta LDIST_{b,l} + \gamma SOC\_CAP_l * LDIST_{b,l} + \delta SHARE\_AREA_{b,l} + \vartheta SHARE\_AREA\_TOTAL_{b,l} + \theta_b + \omega_t + \pi_l + \varepsilon_{b,l,t} \quad (2)$$

We consider the following locality-specific measurement of social capital (i.e. SOC_CAP_l): the diversification index of religious group (HHIREG), the diversification index of ethnic group (HHIETH), the ratio of non-Christian over total number of residents in each locality (MINREG), the ratio of non-white over total number of residents at each locality (MINETH), and the ratio of turnout over total electorates in each locality (TURNOOUT). Our choice is guided by the principal as emphasized by Guiso et al. (2000), they are neither legal nor economic incentives, but rather are more likely to be driven by social pressure and internal norms at the locality level. Religious diversification may negatively affect the degree of cooperation across these individual religious since different religions may have different attitudes toward social interactions and have different associated communication codes (Romanelli and Khessina, 2005). Ethnic diversity might also be associated with lower levels of trust. This could occur because those in homogenous communities have similar tastes, because members of the majority group have an aversion to heterogeneity, or because diverse

communities find it more difficult to enforce a system of social sanctions (Alesina et al., 2003). The use of the participation to vote is in line with Guiso et al. (2000). We obtain data regarding religious and ethnic groups in each postcode area from 2011 census, and data about turnout in each postcode from the general election in 2011. The diversification index of religion group is calculated as the Herfindahl-Hirschman Index of following groups: Christian, Buddhist, Hindu, Jewish, Muslim, Sikh, Other Religion, No Religion and Religion Not Stated. The diversification index of ethnic group is calculated as the Herfindahl-Hirschman Index of following ethnic groups: White (English/Welsh/Scottish/Northern-Irish/British), Mixed/Multiple Ethnic Groups, Black/African/Caribbean/Black British, and Other Ethnic Group. Because the measurements of social capital are time-invariant variables at locality level, its first-order impact of on the net underwriting of SME lending (Mortgage) is subsumed by locality fixed effect. Other variables remain the same as that in Equation (1). We estimate Equation (2) for SME lending and Mortgage, separately. An insignificant coefficient on the interactive term (i.e. γ) would suggest the negative impact of the increased difficulty in the upward transmission of soft information faced by local branch managers with longer functional distance is not mitigated by the expected trust and reciprocity between local branch manager and borrowers (Uzzi and Lancaster, 2003) nurtured by higher level of social capital.

We finally estimate the following model where we pool bank-locality pair sample in the net underwriting of SME lending and Mortgage together:

$$\Delta CR_{c,b,l,t} = \alpha + \beta LDIST_{b,l} + \tau SME\ lending\ dummy_c * Distance_{b,l} + \delta SHARE\_AREA_{b,l} + \vartheta SHARE\_AREA\_TOTAL_{b,l} + \theta_b + \rho_t + \omega_{c,l} + \epsilon_{c,b,l,t} \quad (3)$$

The dependent variable in Equation (3) is the change in outstanding bank credit (c) by bank (b) in locality (l) during t and t-1. *SME lending dummy*$_c$ is a dummy variable which takes value of one if the type of bank credit is SME lending and zero otherwise. To capture the different demands for SME lending and Mortgage at each locality, we include locality-bank credit type fixed effects (i.e. $\omega_{c,l}$). Other variables remain the same as that in Equation (1). The estimated coefficient on $SME\ lending\ dummy_c * Distance_{b,l}$ (i.e. τ) indicates the impact of functional distance on the net underwriting of SME lending, compared to that on Mortgage (i.e. β).

The definition and statistical description of all variables used in the econometric analysis are presented in Table 1.

(Insert Table 1 here)

4. Empirical Results

Table 2 presents the estimated result of Equation (1). Columns 1 – 3 show the results for the change in bank lending to SMEs and columns 4 – 6 show the results for the change in bank and Building Society lending for mortgages. The first thing to notice about the statistically significant negative result on functional distance for SME lending is that there is strong support for distance as an explanatory factor supporting the geographical dimension in small firm lending. This result directly addresses the principal-agent issue of the transmission of soft information up the decision chain of the bank and the complex organizational structure view of Stein (2002). However, looking at the results for mortgage lending, what can be seen is that physical distance is not significant, which given that the data includes the same banks that lend to SMEs plus one Building Society, raises doubts about the scope inefficiency for big banks since they have trouble in engaging in multiple activities that require different policies and procedures.

The second point to note is that the local market conditions variables matters for SME lending but not mortgage lending. The variable SHARE_AREA is negative and significant suggesting that local market dominance has a negative effect on the disbursement of marginal SME lending by banks. The clear message from this finding is that higher local market competition pressure would lead to a higher underwriting of SME lending, which is consistent with (Boot and Thakor, 2000).. The importance of certain localities for mortgage lending is seen by the positive and significant effect of SHARE_AREA_TOTAL, while for SME lending it is not statistically significant. This result says that the higher presence of branches is not served for banks favour in the pursuit of SME business but rather in the pursuit of Mortgage business.

(Insert Table 2 here)

In our bank-locality pair sample, there are observations where the outstanding of SME lending by participating banks at given quarter appear to be zero, although there are no such observations in the case of mortgages. As mentioned previously, a set of parameters were imposed on the figures on SME lending and Mortgage reported by individual participating

banks to ensure the protection of customer confidentiality and compliance with data privacy rules. We can't rule out the likelihood that the zero outstanding is due to the set of parameters rather than zero underwriting. As a precaution against potential bias produced by the use of zero data, we exclude all zero observations from the data. Table 3 shows the results for the sub-sample of non-zero observations. The results for SME lending from Table 2 remain unaffected.

(Insert Table 3 here)

We now turn to the results from estimating Equation (2). Here we introduce the interactive term between locality-specific social capital factor and functional distance. The results are reported in Table 4.

(Insert Table 4 here)

We can see that the main result of a negative effect of distance on SME lending is retained and the estimated coefficient on the interactive term appears not to be statistically significant related to lending to SMEs. The result suggests that the increased difficulty in the upward transmission of soft information due to longer functional distance would mute the proactive attempt of relationship managers in originating lending that the higher quality of social capital would have brought about. The estimated coefficient on the interactive term, however, seems to be statistically significantly positive for the net underwing of mortgage. In particular, we can see that a location with a concentrated religious community has a stronger flow of mortgage funding. A similar story works for a concentrated ethnic composition in a locality. While electoral turnout has no effect on either type of lending, a deeper analysis of the social capital effect shows that it is not simply a concentrated religious and ethnic composition that matters for mortgage lending, but a more a non-Christian and non-minority ethnic composition that is favoured. As a whole, the result suggests that the materialization of a positive impact of a higher level of reciprocal trust and self-enforcement in the local society on the use and the availability of financial contract is conditional on the low constraint faced by local branch managers in the transmission of information within the organization[6]. In the case when the information transmission towards their superiors is primarily hard, higher trust

[6] We re-estimated Equation (2) using a sub-sample with the zero observations for SME lending being excluded. The result appears to be similar as above. For the sake of space, the results are not reported, but available on request.

of the local branch managers about borrowers would lead to a stronger incentive to produce and transfer information.

The estimated results of Equation (3) where we pool the data for lending to SMEs and mortgages together and also attempt to decompose the distance and local market conditions with greater precision using an interaction with a SME dummy variable identifier are shown below in Table 5.

(Insert Table 5 here)

The main result that distance matters for SME lending only still holds. We take this as evidence of the flight to headquarters or 'run to home' syndrome that follows a financial squeeze on credit suppliers[7].

We conduct additional robustness tests to confirm our main results. First, we replace the locality and quarter fixed effects in Equation (1) and (2) with locality-quarter fixed effects to account for the impact on loan granting of all observed and unobserved time-varying locality characteristics such as the riskiness, quality, investment opportunities, the strength of the borrower's bank relationships, and access to other types of market finance. If bank with shorter functional distance away from the locality is more responsive to the improved investment opportunities and increased demand for bank credit in the locality, the estimated coefficient on functional distance will have an upward bias. Such model analyses the net underwriting to the same locality within the same quarter by multiple banks that differ in the closeness to the locality, with all time-varying locality heterogeneity in demand being absorbed by locality-quarter fixed effects[8]. Secondly, we replace the bank and quarter fixed effects in Equation (1), (2) and (3) with bank-quarter fixed effects to capture the impact of time-varying bank-specific characteristics, such as the change in bank's balance-sheet condition and capital position on bank's provision of loans. Such model analyses the net underwriting by the same bank at the same quarter to multiple localities that differ in the closeness to the headquarters of the bank, with all time-varying bank characteristics being

[7] We also re-estimated Equation (3) using a sub-sample with the zero observations for SME lending being excluded. The result appears to be similar as above. For the sake of space, the results are not reported, but available on request.

[8] The results are presented in column (3) and column (6) in Table 2, and in column (3) in Table 3. For the sake of space, the estimated results of Equation (2) are not reported, but available on request.

absorbed by bank-quarter fixed effects[9]. Thirdly, we replace loan type-locality fixed effects in Equation (3) with loan type-locality dummy-time dummy. Such model analyses the net underwriting to the same locality by multiple banks with different functional distance within the same quarter for the same type of loan, with all time-varying locality heterogeneity in demand for the given type of loan being absorbed by locality-quarter fixed effects[10]. Finally, we use actual travelling miles rather than its natural log to proxy for the functional distance and re-estimate Equation (1) to (3)[11].

Our main results hold in all robustness tests: functional distance is strongly negatively related to the net underwriting in SME lending but has no impact on mortgage lending; the prevailing geographically localized social trust appears not to influence the impact of functional distance on SME lending while it positively affect the impact of functional distance on the net underwriting of mortgage lending.

5. Conclusion

This paper has addressed two important issues in the empirical banking literature. The challenge by Petersen and Rajan (2002) that technology has reduced the significance of geography in the SME lending process, suggests that 'hard' information such as credit scores and balance sheet information would increasingly replace 'soft' information garnered by the Relationship Manager. While it is arguable that the global trends of innovation and competition in banking have pushed the industry towards greater automation and more arms-length type banking, the recent global banking crisis has shown that the geographical dimension in lending, at least with respect to small firms, is a sustained feature of the UK banking market[12]. Using a recently available dataset on bank lending by individual banks to postcode areas, this paper has faced the challenge put forward by the technology view and finds strong evidence for its rebuttal.

The conventional view of SME financing is based on supply-side constraints that arise from the 'opaqueness' of the borrower's capacity to repay (de la Tore et al, 2010). This opaqueness undermines the ability of the banks to deal with SME borrowers on an 'arms-length' basis that utilises 'hard' information. Traditionally this has meant that banks have to adopt

[9] The results are presented in column (2), column (3), column (5) and column (6) in Table 2, and in column (2) and column (3) in Table 3, and in column (2) and (3) in Table 5. For the sake of space, the estimated results of Equation (2) are not reported, but available on request.
[10] The results are presented in column (3) in Table 5.
[11] For sake of space, the results are not reported, but available on request.
[12] See for example Lee and Brown (2015), Degryse et al (2015) and Zhao and Jones-Evans (2016).

relationship banking as the means of mitigating the problems of dealing with 'soft' information. The demise of relationship banking and the concentration of lending decisions to regional/HQs has been possibly one of the reasons for the spatial variation in SME lending, particularly in the UK (Gripiaos and Munday, 2000).

The difficulty of verifying soft information leads to the principal-agent problem within the organisation when information production is delegated to lower levels but decision making retained at higher levels. The argument by Stein (2002) is that such agency problems are particular severe in large complex organisations such as banks, and that informational diseconomies result in frictions in the delivery of 'soft information' up the organisational chain. By using mortgage lending as a control in lending by banks to postcode areas we are able to examine the impact of functional distance on SME lending, which is more strikingly dependent on the intermediation of the relationship manager in the transmission of 'soft information'.

This paper argues that since we find no evidence for a geographical dimension to mortgage lending but find strong evidence for an effect on SME lending, we are able to tackle the challenge forwarded by the technology view that advances in informational technology have weakened the geographical element in SME lending, and provide evidence supporting the value of functioning 'relationship' vis-à-vis 'transactional' banking in the provision of SME lending. Finally, the findings our research show that the longer the functional distance the lower the availability of bank credit to SMEs consistent with a flight-to-headquarters or in other words a 'run to home' reaction to the changed financial environment.

References

Agarwal, S., and Hauswald, R., (2010), 'Distance and private information in lending', ***Review of Financial Studies***, 23, 2757–2788.

Alessandrini, P., Presbitero, A.F., & Zazzaro, A., (2009), 'Banks, distances and firms' financing constraints', ***Review of Finance,*** 13, 261–307.

Alesina, A., Devleeschauwer, A., Easterly, W., Kurlat, S., and Wacziarg, R., (2003), 'Fractionalization', ***Journal of Economic growth***, *8*(2), 155-194.

Baker, G., Gibbons, R., and Murphy, K.L., 1999, 'Informal authority in organizations', ***Journal of Law, Economics, and Organizations,*** 15, 56-73.

Bernanke, B., Gertler, M., and Gilchrist, S., (1996), 'The financial accelerator and the flight to quality', ***Review of Economics and Statistics***, 78, 1–15.

Benvenuti M, Casolaro L, Del Pret S and Mistrulli P E (2010), 'Loan Officer Authority and Small Business Lending: Evidence from a Survey', ***Bank of Italy Discussion Paper***, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1657856

Berg, T., Puri, M., and Rocholl, J. (2013). Loan officer incentives and the limits of hard information (No. w19051). National Bureau of Economic Research.

Berger, A., Demsetz, D., and Strahan, P., (1999), 'The consolidation of the financial services industry: Causes, consequences, and implications for the future', ***Journal of Banking and Finance.*** 23, 135-194.

Berger, A.N., and Frame, W.S. (2007), 'Small business credit scoring and credit availability', ***Journal of Small Business Management***, 47, 5-22

Berger, A., and Udell, G. (2006), 'A more complete conceptual framework for SME finance', ***Journal of Banking and Finance***, 30 2945-2966.

Boot, A. W. A.,and Thakor, A.V., (2000), 'Can relationship banking survive competition?', ***Journal of Finance***, 55: 679–713.

Bouwman, C.,and Malmendier, U. (2015), 'Does a bank's history affect its risk-taking?', ***American Economic Review***, 105: 321–325.

Chakravarty. S.P. (2006), 'Regional variation in banking services and social exclusion' ***Regional Studies***, 40, 415-428

Cohen L, Frazzini A and Malloy C (2010), 'Sell-side school ties', ***Journal of Finance***, 65(4), 1409-1437

Cohen, L., Frazzini, A., and Malloy, C. (2008), 'The small world of investing: Bpard connections and mutual fund returns', ***Journal of Political Economy***, 116(5), 951-979

Degryse, H., and Ongena, S., (2005), 'Distance, lending relationships, and competition', ***Journal of Finance***, 60, 231–266.

Degryse, H., Matthews, K., and Zhao, T., (2015), *SMEs and access to bank credit: Evidence on the regional propagation of the financial crisis in the UK*, ***CESifo Working Paper No. 5425. Centre for Economic Studies, Munich***

De la Torre A, Martínez-Periá M.S., and Schmukler S. (2010), 'Bank involvement with SMEs: Beyond relationship lending', ***Journal of Banking and Finance***, 34, 2280-2293.

De Haas, R., and Van Horen, N., (2013), 'Running for the exit? International bank lending during a financial crisis', ***Review of Financial Studies***, 26, 244–285.

Dewally, M., and Shao, Y., (2014), 'Liquidity crisis, relationship lending and corporate finance', ***Journal of Banking and Finance***, 39, 223-239

Duchin, R., and Sosyura, D. (2013). 'Divisional managers and internal capital markets'. ***The Journal of Finance***, 68(2), 387-429.

Dow, S., (1992), 'The regional financial sector: A Scottish case study', ***Regional Studies***, 26, 619-631.

Dow, S., and Rodrigues-Fuentes, C., (1997), 'Regional finance: A survey', ***Regional Studies***, 31, 903–920.

Engelberg, J, Gao P, and Parsons C A, (2012), 'Friends with money', ***Journal of Financial Economics***, 103, 169-188

Gripaios, P. and Munday, M. (2000) "Uneven development in UK financial services: The case of South West and Wales", ***Service Industries Journal***, 20.1, 153-180.

Guiso, L., Sapienza, P., and Zingales, L., (2004), 'The role of social capital in financial development', ***The American Economic Review***, *94*(3), 526-556.

Hutchinson R W and McKillop D G (1990), 'Regional Financial Sector Model: An application to the Northern Irelands Financial Sector', ***Regional Studies***, 24, 421-432.

Klagge B and Martin R (2005), 'Decentralized versus centralized financial systems: Is there a case for local capital markets?', ***Journal of Economic Geography***, 5, 387-421.

Lang, W., and Nakamura, L., (1995), 'Flight to quality in bank lending and economic activity', ***Journal of Monetary Economics***, 36, 145–64.

Lee N and Brown R (2015), 'Thin markets and innovative SMEs: The demand and supply of bank funding in UK peripheral regions', ***Centre for Responsible Banking & Finance, University of St Andrews***, Working Paper 15-011.

Martin, R., and Sunley, P. (2015), 'On the notion of regional economic resilience: conceptualization and explanation', ***Journal of Economic Geography***, 15(1), 1-42.

Özyildrim, S., and Önder, Z. (2008), 'Banking activities and local output growth: Does distance from centre matter?', ***Regional Studies***, 42(2), 229-244.

Petersen, M.A., (2004), Information: Hard and soft, Mimeo, Northwestern University.

Petersen M.A. and Rajan G. R (2002) 'Does Distance Still Matter? The Information Revolution in Small Business Lending', ***Journal of Finance***, 57, 6, 2533-2570.

Romanelli, E., and Khessina, O. M., (2005), 'Regional industrial identity: Cluster configurations and economic development', ***Organizational Science***, 16(4) 344–358.

Ruckes, M., (2004), 'Bank competition and credit standards', ***Review of Financial Studies***,1073–1102.

Stein, J., (2002), 'Information production and capital allocation: Decentralized versus hierarchical firms', ***Journal of Finance***, 57, 1891-1921.

Uzzi, B., (1999) 'Embeddedness in the Making of Financial Capital: How Social Relations and Networks Benefit Firms Seeking Finance,' ***American Sociological Review***, 64: 481–505.

Uzzi, B., and Lancaster, R. (2003), 'Relational embeddedness and learning: The case of bank loan managers and their clients', *Management Science*, 49, 383-399.

Zhao, T., and Jones-Evans, D. (2016), 'SMEs, banks and the spatial differentiation of access to finances in the UK' ***Journal of Economic Geography***, forthcoming.

Table 1: the definition and statistical description of variables used in the analysis

Name	Economic meaning	Obs.	Mean	Standard Dev.	Min	Max
Dependent variables						
$\Delta CR_{c,b,l,t}$	The quarterly change in the outstanding type of loan (i) in locality (l) by bank (b) at time t (CPI deflated) (£mill)	8633	-0.325	22.931	-738.935	170.993
$\Delta SME_{b,l,t}$	The quarterly change in outstanding SME lending in locality (l) of bank (b) (CPI deflated) (£mill)	3954	-0.966	8.569	-139.129	86.606
$\Delta MORT_{b,l,t,}$	The quarterly change in outstanding personal mortgage lending in locality (l) at time t (CPI deflated) (£mill)	4679	0.217	30.126	-738.935	170.993
Independent variables						
SHARE_AREA	The ratio of branches of the bank (b) over total number of branches of all banks in locality (l) (%)	5880	12.555	9.006	0.000	50.000
SHARE_AREA_TOTAL	The ratio of branches of the bank (b) in locality (l) over the total number of branches of the bank (b) in the UK (%)	5880	0.831	0.805	0.000	10.833
LDIST	the natural log of the average physical distance between the branches of bank (b) in locality (l) and the headquarters of the bank (b)	5880	4.940	1.117	-0.378	6.637
HHIREG	The diversification index of religion group is calculated as the HHI of following groups: Christian, Buddhist, Hindu, Jewish, Muslim, Sikh, Other Religion, No Religion and Religion Not Stated	5880	4412.225	750.961	2348.980	6318.330
HHIETH	The diversification index of ethnic group is calculated as the HHI of following ethnic groups: White British),	5880	8079.547	1753.642	3201.843	9853.397

	Mixed/Multiple Ethnic Groups, Black/African/Caribbean/Black British; and Other Ethnic Group.					
MINREG	The ratio of non-Christian over total number of residents in each locality (*l*)	5880	0.409	0.082	0.222	0.663
MINETH	The ratio of non-white over total number of residents at each locality (*l*)	5880	0.118	0.131	0.007	0.566
TURNOUT	The ratio of the number of turnouts over total electorates in each locality (*l*)	5880	0.661	0.033	0.564	0.722

Table 2: The impact of distance on the change in the supply of SME lending and Mortgage

	$\Delta SME_{b,l,t}$			$\Delta MORT_{b,l,t}$		
Independent Variables	1	2	3	4	5	6
SHARE_AREA	-.115***	-.115***	-.127***	-0.021	-0.022	-0.060
	(.033)	(.033)	(.038)	(.055)	(.055)	(.051)
SHARE_AREA_TOTAL	-0.003	-0.006	0.017	1.383***	1.381***	1.452***
	(.328)	.328)	(.359)	(.384)	(.385)	(.393)
LDIST	-.998***	-.996***	-1.037**	0.185	0.181	-0.053
	(.360)	.361)	(.408)	(.465)	(.466)	(.472)
Location dummy	YES	YES		YES	YES	
Bank dummy	YES			YES		
Quarterly dummy	YES			YES		
Quarterly dummy * bank dummy		YES	YES		YES	YES
Location dummy*quarterly dummy			YES			YES
The postcode area where the outstanding shows as zero included (YES/NO)	YES	YES	YES	YES	YES	YES
N	3834	3834	3834	4559	4559	4559
R-SQ	0.108	0.158	0.287	0.411	0.534	0.601

Note: The table contains the estimated results of Equation (1). Distance is measured by the natural log of travelling mile between the postcode area and the headquarters of the bank. The dependent variable for the estimated results in Column 1,2,3 is the change in the outstanding of SME lending of bank b at postcode area l between t and t-1 (CPI deflated); The dependent variable for the estimated results in Column 4,5,6 is the change in the outstanding of mortgage of bank b at postcode area l between t and t-1 (CPI deflated). Different sets of dummy variables which are included in the estimated as indicated. For the sake of space, the results are omitted. Standard errors are in parentheses. Standard errors are clustered at bank*postcode area level. * p<.10, ** p<.05, and *** p<.01. A summary of the definition of all variables is presented in Table 1.

Table 3: The impact of distance on the change in the supply of SME lending and Mortgage with respect to the subsample with outstanding stock ≠ 0

	$\Delta SME_{b,l,t}$		
Independent Variables	1	2	3
SHARE_AREA	-0.130*** (.035)	-0.130*** (.035)	-0.145*** (.041)
SHARE_AREA_TOTAL	0.011 (.343)	0.013 (.343)	0.051 (.376)
LDIST	-1.015*** (.373)	-1.008*** (.374)	-1.058** (.427)
Location dummy	YES	YES	
Bank dummy	YES		
Quarterly dummy	YES		
Quarterly dummy * bank dummy		YES	YES
Location dummy*quarterly dummy			YES
The postcode area where the outstanding shows as zero included (YES/NO)	NO	NO	NO
N	3514	3514	3514
R-SQ	0.115	0.163	0.296

Note: The table contains the estimated results of Equation (1). Distance is measured by the natural log of travelling mile between the postcode area and the headquarters of the bank. The dependent variable is the change in the outstanding of SME lending of bank b at postcode area l between t and t-1 (CPI deflated). The observations which have zero outstanding SME lending are excluded. Different sets of dummy variables which are included in the estimated as indicated. For the sake of space, the results are omitted. Standard errors are in parentheses. Standard errors are clustered at bank*postcode area level. * p<.10, ** p<.05, and *** p<.01. A summary of the definition of all variables is presented in Table 1.

Table 4: the impact of locality-specific social capital on the role of distance for the change in the supply of SME lending and Mortgage

	Δ $SME_{b,l,t}$					$\Delta MORT_{b,l,t}$				
	1	2	3	4	5	6	7	8	9	10
SHARE_AREA	-0.104***	-0.106***	-0.104***	-0.105***	-0.109***	-0.001	-0.002	-0.013	-0.008	-0.008
	(0.031)	(0.031)	(0.029)	(0.031)	(0.032)	(0.055)	(0.055)	(0.054)	(0.055)	(0.055)
SHARE_AREA_TOTAL	0.023	0.032	-0.077	0.008	0.024	1.427***	1.475***	1.327***	1.394***	1.451***
	(0.329)	(0.328)	(0.329)	(0.335)	(0.329)	(0.401)	(0.404)	(0.379)	(0.403)	(0.398)
LDIST	-0.671***	-0.728***	-0.817***	-0.632***	-0.793**	0.796*	0.915**	0.306	0.657	0.715*
	(0.221)	(0.265)	(0.243)	(0.214)	(0.308)	(0.445)	(0.390)	(0.412)	(0.476)	(0.411)
LDIST*HHIREG	0.000					0.001***				
	(0.000)					(0.000)				
LDIST*HHIETH		0.000					0.000**			
		(0.000)					(0.000)			
LDIST*TURNOUT			15.737					12.117		
			(10.870)					(10.324)		
LDIST*MINREG				-4.416					-6.072**	
				(3.419)					(2.785)	
LDIST*MINETH					-1.166					-3.219*
					(1.216)					(1.919)
CONSTANT	9.166***	8.387***	12.180***	11.900***	8.934***	-3.656	-6.982	0.014	0.816	-5.301
	(2.087)	(2.128)	(3.699)	(3.627)	(2.428)	(4.815)	(4.585)	(5.590)	(5.210)	(4.684)

Location dummy	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Quarterly dummy	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Bank dummy	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
The postcode area where the outstanding shows as zero included (YES/NO)	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	3834	3834	3834	3834	3834	4559	4559	4559	4559	4559
R-sq	0.159	0.159	0.161	0.160	0.158	0.536	0.536	0.534	0.535	0.535

Note: the table contains the estimated results of Equation (2). Distance is measured by the natural log of travelling mile between the postcode area and the headquarters of the bank. The dependent variable for the estimated results in Column 1-5 is the change in the outstanding of SME lending of bank b at postcode area l between t and t-1 (CPI deflated); The dependent variable for the estimated results in Column 6-10 is the change in the outstanding of mortgage of bank b at postcode area l between t and t-1 (CPI deflated). Different sets of dummy variables which are included in the estimated as indicated. For the sake of space, the results are omitted. Standard errors are in parentheses. Standard errors are clustered at bank*postcode area level. * p<.10, ** p<.05, and *** p<.01. A summary of the definition of all variables is presented in Table 1.

Table 5: The impact of distance on the change in the supply of bank credit (pooled data)

Dependent Variable: $\Delta CR_{c,b,l,t}$			
	1	2	3
SHARE_AREA	-0.066* (.034)	-0.067** (.034)	-0.092*** (.034)
SHARE_AREA_TOTAL	0.730** (.294)	0.728** (.294)	0.773** (.307)
LDIST	0.626 (.435)	0.621 (.436)	0.353 (.446)
SME lending*LDIST	-2.089*** (.516)	-2.079*** (.517)	-1.818*** (.542)
Location dummy*lending type dummy	YES	YES	
Bank dummy	YES		
Quarterly dummy	YES		
Quarterly dummy*bank dummy		YES	YES
Location dummy*lending type dummy*quarterly dummy			YES
The postcode area where the outstanding shows as zero included (YES/NO)	YES	YES	YES
N	8393	8393	8393
R-sq	0.328	0.398	0.501

Note: The table reports the estimated results of Equation (3). The dependent variable is measured by the change in the outstanding of bank credit c by bank b at postcode are l during time t and t-1 (CPI deflated). Different sets of dummy variables which are included in the estimated as indicated. For the sake of space, the results are omitted. Standard errors are in parentheses. Standard errors are clustered at bank*postcode area level. * p<.10, ** p<.05, and *** p<.01. A summary of the definition of all variables is presented in Table 1.